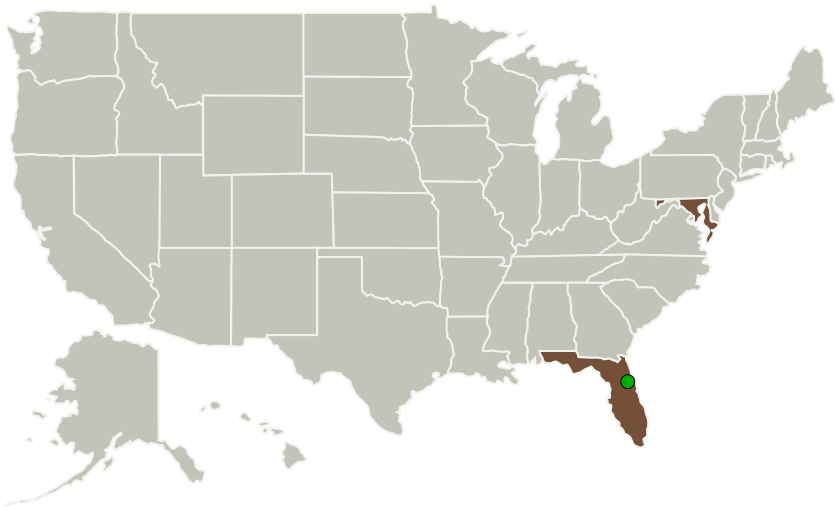
A Portable, Linear-Array Ultrasonic Imaging System for Rapid Inspection of Large-Area Composite Structures, Phase I

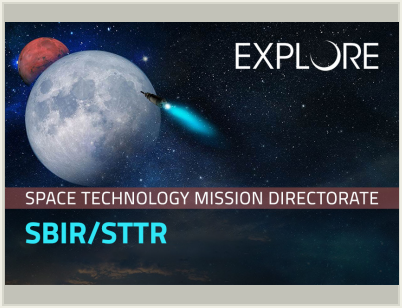
Completed Technology Project (2012 - 2012)

Project Introduction

The use of composites in aircraft manufacturing is growing dramatically. To ensure the integrity of composite structures and bonded joints, a variety of nondestructive evaluation (NDE) technologies have been developed over the past three decades. Among them, the ultrasonic and acoustic based technologies (e.g., ultrasonic C-scan, resonance, mechanical impedance analysis, and tap test) have proven to be successful in many field applications, especially for delamination and disbond inspections. However, most conventional ultrasonic NDE methods are based on point-by-point inspection scheme, which is either subjective in manual operation or time-consuming when a large area needs to be inspected. In this proposal,X-wave Innovations, Inc. (XII) and North Carolina State University (NCSU) propose an innovative linear-array ultrasonic technique for rapid inspection of large-area composite and bonded structures. The success of the proposed effort will result in the development of a novel technique that will provide rapid, reliable, and accurate inspection and evaluation for composite structures and bonded assemblies, as well as an ultrasonic NDE system that is inexpensive, portable, and easy to use. This system will be suitable for field testing of defects (including disband and delamination) in various composite materials and bonded structures

Primary U.S. Work Locations and Key Partners





A Portable, Linear-Array Ultrasonic Imaging System for Rapid Inspection of Large-Area Composite Structures, Phase I

Table of Contents

A Portable, Linear-Array Ultrasonic Imaging System for Rapid Inspection of Large-Area Composite Structures, Phase I

Completed Technology Project (2012 - 2012)

Organizations Performing Work	Role	Type	Location
X-wave Innovations	Lead Organization	Industry Women-Owned Small Business (WOSB)	Gaithersburg, Maryland
Kennedy Space Center(KSC)	Supporting Organization	NASA Center	Kennedy Space Center, Florida

Primary U.S. Work Locations	
Florida	Maryland

Project Transitions

February 2012: Project Start

August 2012: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/137918)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

X-wave Innovations

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

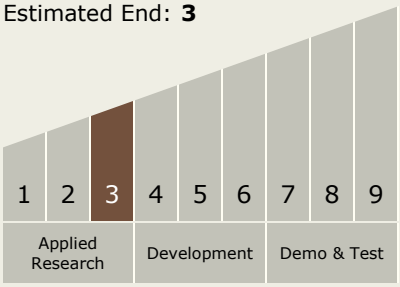
Carlos Torrez

Principal Investigator:

Carlos Rentel

Technology Maturity (TRL)

Current: **3**
Estimated End: **3**



A Portable, Linear-Array Ultrasonic Imaging System for Rapid Inspection of Large-Area Composite Structures, Phase I

Completed Technology Project (2012 - 2012)

Technology Areas

Primary:

- TX13 Ground, Test, and Surface Systems
  - TX13.2 Test and Qualification
    - TX13.2.3 Non-Destructive Inspection, Evaluation, and Root Cause Analysis

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System